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# Knowledge, attitude, and perception on organ donation among undergraduate medical and nursing students at a tertiary care teaching hospital in the southern part of India: A cross-sectional study

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## Abstract:

**BACKGROUND:** Organ donation is considered to be a noble act. Medical and nursing students will be the major healthcare providers in this field in the future. Hence, their knowledge, attitude, and perception toward organ donation are essential to improve this field in the future.

**OBJECTIVE:** The objective of this study is to assess the knowledge, attitude, and perception on organ donation among undergraduate medical and nursing students. This study brings forth the basic understanding level of the medical and nursing students on the concept of organ donation.

**METHODS:** A cross-sectional descriptive study was conducted among the first 4 academic years of medical and nursing students in a tertiary care teaching hospital using convenient sampling. A total of 620 students participated in this study. They were assessed using a pretested semi-structured self-administered questionnaire. The data were analyzed using Statistical Package of the Social Sciences version 19.

**RESULTS:** The median score on knowledge, attitude, and perception among the medical students was 16 (14–17), 25 (23–28), and 41 (38–45), respectively, and among the nurses, the scores were 14 (12–16), 25 (22–27), and 39 (33–42), respectively. Almost half (46.9%) of the study participants knew the definition for brain death. Twenty-nine percent of the study participants knew about the existence of law toward organ donation; more than half of those participants (52.7%) mentioned few rules and regulation involved in the laws pertaining to organ donation.

**CONCLUSION:** Media is the major source for information. Only less than half of the study participants were knowledgeable on the definition of brain death and existence of organ donation law. Although they are in favor of organ donation, doubts still exist among few of the participants which could be understood through further research in this field.

## Keywords:

Awareness, brain death, knowledge, medical students, nursing students, organ donation

## Introduction

In the last few decades, there had been a tremendous growth in the field of organ transplantation. Advancement in the science

of organ transplantation had improved and saved many people suffering from end-stage organ failure as it is the standard treatment for some of the end-stage organ failure diseases. Solid organ transplant programs

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have been steadily growing but have still not kept pace with the global needs, with great differences among countries. Organ transplantations are valuable for a developed and mature healthcare system.<sup>[1]</sup>

The first organ transplantation in the world was performed in 1954. Henceforth, the organ transplantation science grew from experimental state of practice to a standard state of practice for certain end-stage organ failure.<sup>[2]</sup> Although the public is well aware of blood donation and it is frequently practiced, organ donation is yet to catch up.<sup>[3]</sup> Among the 9.5 million deaths in India every year, nearly 0.5 million deaths are due to organ failure.<sup>[4]</sup> India, with a population of 1.34 billion people, is lagging behind in organ donation with a national deceased donation rate of <1 per million population (pmp); however, Tamil Nadu has shown high ODR (Organ Donation Rate) compared to national average, i.e. 2.1 pmp.<sup>[5]</sup>

There are various studies conducted among the public to assess the awareness on organ donation, but only few were conducted among the medical and nursing students in India.<sup>[6]</sup> Therefore, this study was intended to assess the knowledge, attitude, and perception of organ donation among undergraduate medical and nursing students in the Southern part of India.

This study will be useful to understand the level of knowledge, attitude, and perception toward organ donation in the Southern part of India. As the healthcare professionals are proven factors to influence the ODR,<sup>[7]</sup> knowing this among these critical populations would help in leveraging strategies to increase ODR.

## Methods

A cross-sectional descriptive study was conducted among the 1<sup>st</sup> to 4<sup>th</sup> year undergraduate medical and nursing students in 2017 at a government tertiary care teaching hospital, Puducherry, India. The duration of the study was 8 months (i.e. March–October 2017). This duration of the study included the stages of research such as drafting the proposal, questionnaire preparation, ethical approval, data collection, data entry, analysis, and drafting of final write-up.

The study was carried out using convenient sampling. However, we contacted all the eligible students, and 620 students participated in the study and completed the questionnaire. Participation was voluntary and written informed consent was obtained from each participant. The ethical approval was sought from the institute ethics committee (IEC-JIPMER).

A pretested semi-structured self-administered questionnaire sought information on sociodemographic

background, knowledge, attitude, and perception regarding organ donation. The questions were asked as an open-ended question, true/false, and Likert scale. Knowledge, attitude, and perception were assessed using 9, 6, and 12 questions, respectively. The questionnaire was filled by the students with an average time of  $10 \pm 5$  min. A standard definition was used to evaluate the participants on brainstem dead.<sup>[8]</sup>

Prior permission was sought from the dean of the medical college and principal of the nursing college. Further, permission was sought from the professors of the respective seminars after which the data were collected from the students. The language of the questionnaire was in English as all the students are familiar with the language, also the medium of education was English. The purpose and the usefulness of the study were explained to the students, following which the consent to participate was obtained from all participants. There was no attempt made to collect data from the students who were absent during the day of data collection as the sample number of participants had exceeded the calculated sample size.

## Statistical analysis

Only completed questionnaires were analyzed. Data entry was done in Microsoft Excel 2010, and then, data were exported to IBM Statistical Package of the Social Sciences version 19 (IBM, PASW Statistics, India Country Office, Bangalore, India), for management and analysis. A continuous variable such as age was described as mean and Standard Deviation. The descriptive measurements were represented as proportions, percentages, frequency distribution, and measures of central tendency. The analytic statistical tests such as Chi-Square and Mann–Whitney were applied to find the differences in knowledge, attitude, and perception among the medical and nursing students wherever appropriate.

## Results

There were a total of 620 participants comprising 375 undergraduate medical students and 245 undergraduate nursing students. There were higher proportion of female participants (59.7%,  $n = 370$ ) compared to male participants (40.3%,  $n = 250$ ). The mean age of the study participants was  $19.8 \pm 1.65$  years.

The overall median score of knowledge, attitude, and perception among the undergraduate medical and nursing students was 15 (13–17), 25 (23–27), and 40 (36–44), respectively. Toward attitude, both medical and nursing students had similar median scores of 25 (23–28) and 25 (22–27), respectively. Medical students showed higher median score for knowledge (16 [14–17]) and for perception (41 [38–45]) compared to the nursing

students' median score for knowledge (14 [12–16]) and perception (39 [33–42]), respectively, which were statistically significant [Table 1].

Among the study participants, 6.1% had a family history of organ donation/transplantation. An open-ended question was used to assess the knowledge of brain death. The answers were compared against a standard definition of brainstem death,<sup>[8]</sup> and based on that, it was estimated that 46.9% of the study participants mentioned the correct meaning of brain death, whereas 25.5% of the study participants had no knowledge regarding brain death and the remaining 27.6% of them had an incomplete knowledge on brain death.

Our study estimated that 29.4% of the study participants knew about the law for organ donation. More than half of those study participants (53.7%) mentioned a few laws regarding organ donation. The study participants were mostly aware on the donation of the kidney (92.3%), heart (87.4%), lungs (80.2%), eye (79.8%), liver (74.2%), and cornea (42.1%). Organs such as intestine, uterus, pancreas, head, bone marrow, spleen, limbs, and whole body were combined under the other category, which contributed around 19.9% [Figure 1].

Multiple responses were collected to assess the source of information regarding organ donation. More than 50% of the study participants responded that television, social media, newspaper, and healthcare providers as their important source of information regarding organ donation. Posters, family, and friends served as the source of information for 30% of the study participants. There were few other sources such as lessons, pamphlets, and street dramas mentioned by the study participants [Figure 2].

### Discussion

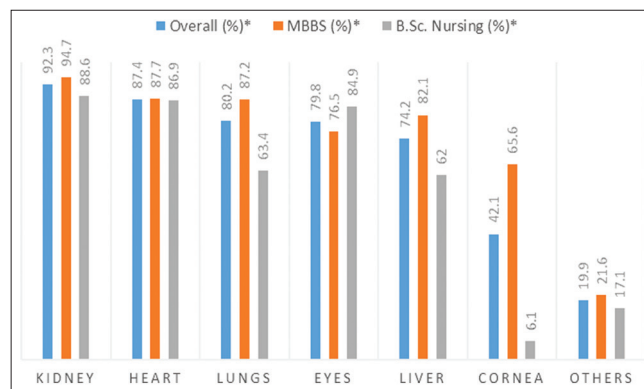
The findings suggest that the students had higher knowledge and favorable attitude and perception toward organ donation [Table 1]. To the best of our knowledge, this is one of the few studies in India which assessed both the undergraduate medical and nursing students in the same study. The medical and nursing students play an important role in educating the masses on organ donation.<sup>[3,9]</sup> The mean age of the study participants involved in this study was 19.8 ± 1.6 years, with a higher proportion of females which is similar to other studies.<sup>[10-12]</sup>

The source of information on organ donation was similar to other study conducted in the southern part of India,

**Table 1: Overall knowledge, attitude, and perception scores regarding organ donation among the study participants and the association between the MBBS and B.Sc. nursing students. MBBS (n=375) and B.Sc. nursing students (n=245)**

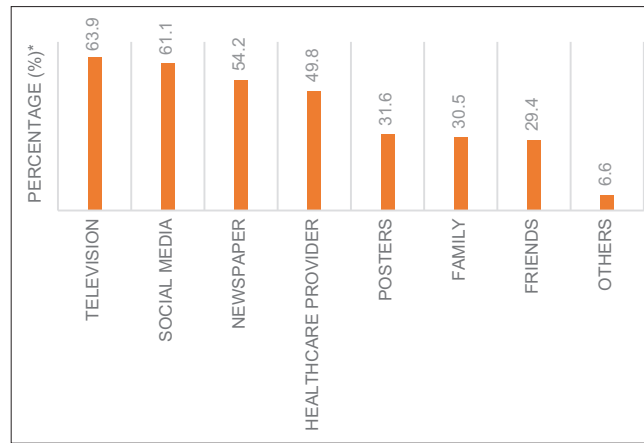
Characteristics	Overall Median (IQR)	MBBS Median (IQR)	B.Sc Nursing Median (IQR)	P*
Knowledge <sup>†</sup>	15 (13-17)	16 (14-17)	14 (12-16)	<0.001
Attitude <sup>‡</sup>	25 (23-27)	25 (23-28)	25 (22-27)	0.175
Perception <sup>§</sup>	40 (36-44)	41 (38-45)	39 (33-42)	<0.001

\*Mann-Whitney test; <sup>†</sup>(max. score 18); <sup>‡</sup>(max. score 30); <sup>§</sup>(max. score 55)



**Figure 1:** Awareness among the study participants regarding organs that can be donated (overall [n = 620], MBBS [n = 375], and B.Sc. Nursing [n = 245]). \*Multiple responses were recorded

	Kidney	Heart	Lungs	Eyes	Liver	Cornea	Others
Overall (%)*	92.3	87.4	80.2	79.8	74.2	42.1	19.9
MBBS (%)*	94.7	87.7	87.2	76.5	82.1	65.6	21.6
B.Sc. Nursing (%)*	88.6	86.9	63.4	84.9	62	6.1	17.1



**Figure 2:** Source of information for organ donation among the studied participants.  
\*Multiple responses were recorded check the units and give it in text

	Television	Social Media	Newspaper	Healthcare provider	Posters	Family	Friends	Others
Percentage (%)*	63.9	61.1	54.2	49.8	31.6	30.5	29.4	6.6

with our study showing 53% of the study participants learned about organ donation through electronic media, 34.1% through healthcare providers, and 13% through friends and colleagues.<sup>[13]</sup> Few other studies in India and elsewhere also suggested that television was found to be the major source of information.<sup>[10,14,15]</sup> A study conducted at California showed that 30% of the study participants' knowledge was influenced by their physician, which was identical with our study.<sup>[16]</sup> This helps us in understanding that television and healthcare providers can be used as a medium for improving awareness among the population.

### Knowledge

In India, about 0.5 million people die every year due to nonavailability of the organ<sup>[3]</sup> making the wait list to obtain an organ exponentially longer with the present ODR. Our study showed that 89% of the study participants were much aware regarding the deaths due to nonavailability of organs in India [Table 2]. Among the nursing students in our study, 65.7% of them recognized that Indians wait long for a deceased donor transplant [Table 2], which is similar to another study among the nursing students.<sup>[10]</sup> This may be due to their clinical postings and interactions with the patients and families who undertake dialysis in their institute.

All our study participants mentioned that they had heard about organ donation supported by another study.<sup>[10]</sup> Our study showed that 46.9% of the study participants knew about the correct definition of brainstem death, 17.7% of the study participants had moderate knowledge regarding the brain death definition, and 13.7% of the study participants were not clear regarding the definition of brain death. This could have occurred due to myths and misconception that

prevail regarding brain death.<sup>[17,18]</sup> Although another study showed that 80% of the study participants knew the correct definition for brain death, their responses were collected based on choices (yes/no options) and not open-ended question;<sup>[19]</sup> however, in our study, we used an open-ended question to assess their knowledge on brain death which eliminated the social desirability bias.<sup>[20]</sup> Knowledge on brain death was more among medical students compared to nursing students in this study; this could have occurred due to the lack of in-depth brainstem death subjects in their curriculum. Studies have also proved that this can be improved through educational materials.<sup>[21-23]</sup>

The Government of India enacted a law (Transplantation of Human Organs [Amendment] Act 2011) to curtail commercialization in organ donation and promote organ donation following brain death.<sup>[24]</sup> Other studies showed that only 6%–13.9% of the study participants were aware regarding the organ donation law;<sup>[10,13,15,25]</sup> however, in our study, 29% of the study participants were aware regarding the existence of organ donation law. This may have occurred as the study was conducted in high-ranked medical schools of India.

### Attitude

Family members play a vital role in India toward any decision-making,<sup>[23,26]</sup> and hence, the donor is not the sole decision-making authority for the deceased organ donation; among the nursing participants in our study, 65.3% of them agreed that permission from the nearer family member is also very essential. Other similar studies have shown that 60%–80% of the study participants agreed to the same.<sup>[10,27,28]</sup> Among the medical students in our study, 56.8% of them also agreed with the same, and this was also supported by another study conducted

**Table 2: Knowledge among the MBBS (n=375) and B.Sc. nursing students (n=245) based on each question used to assess their knowledge level.**

Questions	MBBS		B.Sc. Nursing		p*
	n	(%)	n	(%)	
Demand for organ is higher when compared to the present donation level					
yes	364	(97.1)	219	(89.4)	
no	1	(0.3)	7	(2.9)	
no answer	10	(2.7)	19	(7.8)	<0.001
People on waiting list die every day due to non-availability of organ					
yes	354	(94.4)	195	(79.6)	
no	9	(2.2)	33	(13.5)	
no answer	12	(3.2)	17	(6.9)	<0.001
Donation of organ or tissue disfigures the body, hence open casket cannot be done					
yes	264	(70.4)	109	(44.5)	
no	33	(8.8)	33	(13.5)	
no answer	78	(20.8)	103	(42)	<0.001
Indians wait long for a deceased donor transplant					
yes	316	(84.3)	161	(65.7)	
no	10	(2.7)	43	(17.6)	
no answer	49	(13.1)	41	(16.7)	<0.001
It is illegal to sell organs in India					
yes	331	(88.3)	181	(73.9)	
no	23	(6.1)	46	(18.8)	
no answer	21	(5.6)	18	(7.3)	<0.001
A donor can specify the organs that they are willing to donate					
yes	356	(94.9)	223	(91)	
no	11	(2.9)	16	(6.5)	
no answer	8	(2.1)	6	(2.4)	0.06
Immediate relative should give permission while signing a donor card					
yes	213	(56.8)	160	(65.3)	
no	126	(33.6)	61	(24.9)	
no answer	36	(9.6)	24	(9.8)	0.065
Once living donor decides to donate the organ, their decision cannot be changed					
yes	267	(71.2)	156	(63.7)	
no	56	(14.9)	67	(27.3)	
no answer	52	(13.9)	22	(9)	0.192
Once signed the donor card the treatment that the living donor receives would change					
yes	254	(67.7)	113	(46.1)	
no	38	(10.1)	60	(24.5)	
no answer	83	(22.1)	72	(29.4)	

\*Chi-Square test

in the southern part of India.<sup>[13]</sup> This shows the attitude of the study participants on consent for organ donation from the family members and also the importance of gaining family's permission before retrieval.

The median score for the statement that religion opposes organ donation was 3 (2–4) in our study [Table 3]; similar studies also supported this result.<sup>[10,13]</sup> This could have been attributed due to the differences of opinion from various religious groups, which has been proved in other studies.<sup>[27,29,30]</sup> The median score for the statement on willingness to donate their organs was higher (4 [4–5]) in our study [Table 3] similar to studies;<sup>[10,11,13,28,31]</sup> however, further questions were not asked if they have signed an organ donor card which could have informed us about their practice.

### Perception

Majority of the participants in our study perceived that organ donation is safe and effective, with a median score of 4 (3–5) [Table 3] supported by another study conducted among the nursing students;<sup>[10]</sup> whereas people-seeking healthcare from tertiary care centers in the southern part of India from another study perceived that health risk is associated with organ donation.<sup>[28]</sup> As our study was among the healthcare-oriented group, their negative perceptions were low, unlike the public.<sup>[28]</sup> This may suggest the myths and misconception that prevail in the society affecting their perception.<sup>[4]</sup>

Study participants perceived that doctors will strive hard to save the life of the patient in spite of their decision toward organ donation, with a higher median score of

**Table 3: Attitude and perception among the MBBS (n=375) and B.Sc. nursing students (n=245) based on each question used to assess their attitude and perception level.**

Attitude Questions	Overall Median (IQR)	MBBS Median (IQR)	B.SC. Nursing Median (IQR)	p*
Religion opposes organ donation	3 (2-4)	4 (2-5)	3 (2-4)	< 0.001
I support organ donation	5 (4-5)	5 (4-5)	5 (5-5)	< 0.001
I would accept an organ transplant for myself, if my life was in danger	5 (4-5)	5 (4-5)	5 (4-5)	0.213
I am willing to donate my organs after my death	4 (4-5)	4 (4-5)	5 (4-5)	< 0.001
I have been taught that organ donation is against my religion	4 (4-5)	5 (4-5)	4 (3-5)	< 0.005
Organs can be bought and sold in the black market	5 (4-5)	5 (4-5)	5 (4-5)	0.674
Perception Questions				
I think organ donation is a safe and effective practice for donor and recipient	4 (3-4)	4 (3-4)	4 (3-4)	< 0.05
I trust that the hospital and doctors use donated organs as they are intended to be used	4 (3-4)	4 (3-4)	4 (3-4)	0.71
I think that doctors try hard to save my life no matter if I am a donor or not	4 (4-5)	4 (4-5)	4 (3-5)	< 0.005
Organ donation is consistent with my values and belief	4 (4-5)	4 (4-5)	4 (3-5)	< 0.001
It is important for a person to have all their parts of the body during burial	4 (3-5)	4 (3-5)	4 (2-5)	0.477
Regular funeral cannot be carried out for a deceased donor	4 (3-5)	4 (4-5)	4 (2-5)	< 0.001
The recipient should pay some money to the donor family	4 (3-4)	4 (3-4)	3 (2-4)	< 0.005
No extra bill should be paid by the donor family for retrieving the organ	4 (2-5)	4 (2-4)	4 (2-5)	0.535
Organ donation allows something positive to come out of a person's life	5 (4-5)	5 (4-5)	4 (4-5)	< 0.05
I believe that if I donate my organs in this life I will not have it in my next life	3 (1-5)	4 (2-5)	2 (1-4)	< 0.001
It is important to discuss the willingness to donate organs with the family members	4 (4-5)	4 (4-5)	4 (4-5)	0.339

\*Mann-Whitney test

4 (3-4) [Table 3]; this was also supported by a similar study conducted among the nursing students.<sup>[10]</sup> This elicits the trust of healthcare ethics. Another study also supports our study that a higher proportion of study participants perceived that no extra bill should be paid by the donor family for retrieving the organs.<sup>[10]</sup> Although the perception is more positive among this study participants, this has proven to be different among the common public.<sup>[28,32-35]</sup>

### Conclusion

Media was found to be major source of information on organ donation. Only less than half of the study participants had adequate knowledge on brain death and law toward organ donation. It also showed a strong attitude toward permission from the family members to be sought before retrieving the organs of the deceased. The attitude toward willingness to be an organ donor was high. There was high trust toward the healthcare professionals working in the field of organ donation.

### Strengths and weakness

An open-ended question to avoid the social desirability bias on the participants' knowledge on brain death through which the true information was gathered, high response rate, and larger sample were the strengths of this study. Information on the number of study

participants who have signed an organ donor card could have been explored to understand the gap between willingness and practice. Convenient sampling and a study site in a region where the literacy rate is higher and also in a region with good ODR make this study not to be generalized with the other population. Albeit its nongeneralizability, this study gives an in-depth understanding on the knowledge, attitude, and practice of this particular population in this particular region.

### Recommendations

As media has been found to be the major source of information, this can be used as an effective medium for communication on organ donation. The medical and nursing students are one of the critical populations for promoting organ donation.<sup>[7]</sup> The knowledge, attitude, and perception can still be levered through including the subject of organ donation procedures in the curriculum and also by conducting more awareness campaigns.<sup>[21-23]</sup> The recent change in the medical curriculum has included the training for counseling the patients and families on organ donation.<sup>[36]</sup> Hence, this base understanding will help us in the implementation of proper training materials for students based on this information.

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### Conflicts of interest

There are no conflicts of interest.

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